

# An introduction to EMIS Marine Analyst to assist in the management of European seas

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The Marine Analyst of the Environmental Marine Information System (EMIS) provides simple methods to explore European seas and assess the pressures they are exposed. It assists in the management of Marine Protected Areas (MPA) and is conceived as a tool to support the implementation of the Marine Strategy Framework Directive (MSFD) through communicating environmental information/indicators of relevance to various descriptors of the Directive. It corresponds to the Joint Research Centre of the European Commission's efforts to provide a large variety of end-users including policymakers and decision-makers, experts and researchers with means to assess, monitor and possibly forecast the state and pressure of marine areas.

The Marine Analyst has been developed as a simple web application based on a set of distributed informatics infrastructures, an open source "R" framework combined with interoperable web services:

- Marine geoportal and Marine Maps platform: EMIS is a spatial data infrastructure (SDI) (mapserver, Geonode) developed for the publication and dissemination of marine information for European Seas.
- Open source R framework (EMIS-R): The EMIS Web services associated to R-written functions (EMIS-R package) allows the processing of EMIS data, their analysis and reporting.
- Interoperable web services: EMIS offers INSPIRE web services as Web Map Service (WMS) and time Web Coverage Service (WCS-t) in accordance with the Open Geospatial Consortium (OGC) specifications and INSPIRE standards to ensure full interoperability.

The Marine Analyst and EMIS supplies the users with: i) the provision of continuous, detailed and accurate marine/coastal environmental data as derived from satellite observations (ocean colour, sea surface temperature), model outputs, bathymetry, habitats,...; ii) the generation of indicators for diagnostic of the coastal state and analyses of changes in marine ecosystems (anomalies); iii) basic navigation and interrogation tools with basic statistics and time-series analysis.

The EMIS Marine Analyst aims to demonstrate to the experts and institutions the interest of using the EMIS-R package as an open source framework for establishing baselines for research and reporting on marine areas.

Keywords: Information system, European seas, remote sensing, ecosystem indicators, Marine Protected Areas, Marine directive, water quality assessment, INSPIRE web services, Spatial Data Infrastructure